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BILIARY TRACT DISEASE: SOME LESSONS LEARNED FROM DUODENOBILIARY DRAINAGE. FUTURE PROBLEMS. CITATION OF CASES.*

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Four years have now elapsed since the late Professor Samuel J. Meltzer announced the effect that magnesium sulphate produced on the duodenum and on Oddi's sphincter of the common duct when locally introduced,[1] and four years have likewise elapsed since this observation of Meltzer's was applied clinically by means of the duodenal tube in the diagnosis, and, later, in the treatment of diseases of the biliary tract. Around this has gradually been built up a method of non-surgical drainage of the duodenobiliary tract which has already been proved to have great merit in diagnosis and is being proved to have a great field of usefulness in treatment. Much of the evolution of the technical details of this method have been published in earlier papers [3], [4], [5], [6], [8], [12]. A certain period of time must elapse before an estimate of this *method of treatment* can be properly made. During the past year a number of articles have been published which indicate that there is a general and widespread interest in this work. Brown[9] has favorably reported his results in a series of some 70 cases, the method being used principally for diagnosis. Einhorn[13] in a paper dealing with the action of various salts when introduced into the duodenum has attempted to put forward another explanation for the color changes following the installation of magnesium sulphate. In this article he has carefully noted the changes in the physical and clinical properties of the bile obtained, but we believe he has entirely misinterpreted their meaning. If Dr. Einhorn will follow our technic in detail or improve his own we feel convinced that as his personal experience with this method enlarges he will satisfy himself that our original premises are correct. Smithies[14] in a very complete paper has presented his favorable attitude toward the usefulness of this method of non-surgical drainage as an aid to both diagnosis and treatment. Recently, Whipple[15] has written on it from the surgical viewpoint and has emphasized its value as an aid to preoperative diagnosis. Also reference to this method can be found in chapters by Sir Humphrey Rolleston on gall-tract diseases which appear in the *Oxford Loose-leaf System of Medicine.*

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Still more recently Simon[16] presented his experiences with this method, both diagnostically and therapeutically, and reports most favorably on it. His paper was thoroughly discussed and those familiar with the method appear to endorse it most strongly.

Finally, Crohn, Reiss and Radin[17] have presented the results of their investigations into the premises upon which the rationale of this method is based and have taken exception to some of the views we have expressed. We welcome the appearance of such a paper because it reflects a true investigative spirit and an attempt at a logical interpretation of the experimental data which they collected. Their contribution is too long to admit of free discussion in this paper and so important as to require a detailed reply which will be published elsewhere. They, however, conclude this paper as follows:

"While we have not succeeded in utilizing the diagnostic test of Lyon for the identification of chronic gall-bladder disease we think that the subject is entitled to much consideration and thought."

We believe that now sufficient water has run under the bridge to evaluate the position that this method of non-surgical biliary drainage occupies today and to further predicate our views as to certain possibilities it possesses for future endeavor. To this end we have undertaken an intensive study of 100 consecutive cases of gall-tract disease observed in private practice, starting from a period when the technic of this method had become perfected and carrying each case through a proper length of time so that it might be judged fairly on its own merits as an individual case.

The records of these patients were very carefully analyzed from 305 tabulated points of view, embracing etiology, symptomatology, physical examination of the entire gastro-intestinal tract and the common routine and various special methods of clinical examination. Thirty-one of them were studied by the roentgen ray and 35 of them by a careful review of the findings of previous abdominal laparotomies, 17 of which were operations or reoperations upon the biliary tract itself. These 17 laparotomies represented gall-tract operations done on 12 patients, 4 of whom had been operated upon twice and 1 patient three times, and all 12 of them were complaining bitterly of symptoms still referable to the upper right quadrant. Eight of these 100 cases we referred for operation or reoperation upon the gall tract and in each one our preoperative diagnostic findings were confirmed in detail. Twenty-two of them had had their appendices previously removed. Finally all were studied and restudied in the light of the direct evidence furnished by the cytology, chemistry and bacteriology of the bile and the manner of its delivery into the duodenum and by the reactions on the individual patient of this non-surgical method of biliary drainage. These various procedures provided the planks in the diagnostic platform. Ninety-four of these 100 cases were carried through a course of treatment by us and these cases particularly were critically analyzed and, where there was any reasonable doubt, the end-result was entered against us as being unsuccessful rather than successful.

We propose in this paper to point out some of the lessons we have learned in regard to the importance of securing certain historical, physical, laboratory and technical data as a necessity in properly diagnosing and classifying cases of gall-tract disease (with or without complications) as a first step in a decision for or against their management by surgical or non-surgical methods; to point out some of the lessons we have learned both for and against the therapeutic effectiveness of non-surgical biliary drainage; to point out some of our impressions both for and against the effectiveness of surgical procedures as examplified in the cases studied, and, finally, to present some of our views as to future problems of biliary-tract disease which must be worked out.

In a critical study of the very excellent paper by Cheyney[7] on the "Diagnosis of Gall-bladder Disease" we were very much impressed with the favorable case he (entirely unwittingly) made for the value of our method of studying the upper right quadrant group of patients by duodenobiliary drainage, as one of us has previously advocated. Any impartial reader of Cheyney's paper will probably realize that he has truly stated the facts in regard to his classification of his first three groups, based upon a diagnosis determinable alone upon a carefully taken history, physical examination amplified by the roentgen ray and the simpler routine laboratory studies of the stomach and the stools.

Permit us to quote from and comment on a paragraph from this paper. He says: "Thus in Group 1 of gall-bladder histories *recurring attacks of biliary colic* (italics are our own) characterize the story, with good health between. In Group 2 stomach symptoms play a prominent part but the *colic attacks* (italics are are own) still form the diagnostic featrue. In Group 3 the stomach symptoms preponderate, *colic* (italics are our own) has disappeared and the gall-bladder symptoms have quieted down to minor importance."

Comment. These cases are all manifestly *late* cases in the sense of having already reached the formed calculus stage as demonstrated operatively in the finding of gall-stones in each of the illustrative cases Dr. Cheyney has selected or they are *late* cases in the association of formed pathology, such as thickened gall-bladder or duct walls, inflammatory adhesions or involvement of the pancreas, duodenum and their lymph nodes. *These are the easy gall-bladder cases to diagnose and they are easy because we diagnose them too late to accomplish anything except by surgical measures at some risk to the patient and often too late to permit the surgeon to apply corrective surgery which will be permanent in its good results for the patient.*

Cheyney further says, "In Group 4 there are no symptoms but those produced by the stomach, over months or years, and the gall-bladder speaks only vicariously, calling no attention directly to itself."

Comment. This is the important group to recognize in this stage of precalculous formation and prepathology. We must learn to diagnose this group if we desire to advance our present status of management of gall-bladder disease, and we can learn to do so by utilizing the intimate and direct diagnostic measures which have been emphasized in earlier papers and not wait for the months or years to pass during which stones are forming and inflammatory adhesions being developed. *Diagnosed at this stage many cures can be accomplished therapeutically by this method without having later recourse to surgery.*

Finally, Cheyney says: "There should really be a Group 5 described where the gall-bladder contains stones but gives rise to no symptoms of any kind until either some sudden attack of pain or operation performed for some other ailment reveals cholelithiasis.

But these cases sooner or later develop symptoms that put them into one of the four groups described, and they cannot be diagnosed until they do."

Comment. With this we would like to emphatically disagree. They can be diagnosed, but not by the analysis of the history or the physical examination, not by the forty-five minute test meal extraction nor by the roentgen-ray examination unless it is unequivocally positive. This group of so-called quiescent stones is necessarily also a late stage which has gone entirely unrecognized in its formative period, and we believe many cases of this group, as well as of Group 4, may in the future be included in the class of *preventive medicine* if more patients were routinely studied and treated by this method. Certainly all cases which give in their histories suggestive etiological factors such as typhoid fever, influenza, chronic bronchitis, tonsillitis recurrens, chronic nasopharyngitis, sinusitis or oral sepsis should have such a study made. Also those patients require such a study who give a history of catarrhal jaundice and also perhaps more particularly, those who have a progressive brownish pigmentation of the skin and who frequently show some jaundice of the sclera and of the hard palate or who may have the spider-web like tracings of capillary anastomoses of the collateral portal circulation just above the costal margin or who may have multiple telangiomas. This group of cases is too frequently overlooked and the skin pigmentation will be frequently found due to chronic poisoning from static bile within the gall-bladder or within the smaller bile ducts around the liver lobules or due to poisoning from the waste products filtered out from the portal circulation by the liver and excreted in the bile; but poisonous products which are again reabsorbed into the portal system and carried back to a liver whose cells are becoming more and more fatigued by the endless load thrown upon them until they ultimately fail to secrete a bile normal in its chemistry. Among this group will be found many cases of migraine, with or without biliousness, who have become victims of cholagogue laxative habits. Many cases of unsuspected duodenitis and of ileocolitis and sigmoiditis are among this group, as well as many cases whose appendices have been removed but who still continue to complain of gastro-intestinal dyspepsias of vague and nondescript types. Here, too, lie many cases of chronic visceroptosis with static bile from partial obstruction due to traction on supporting peritoneal attachments in the upper right quadrant. We believe that many of these types of cases may be like those found in Cheyney's fourth and fifth groups. Most of these cases *can* be diagnosed as having biliary tract disease, but only by an intimate study of the chemistry, physical properties and the cytology and bacteriology of the gastroduodenobiliary fluids when analyzed with and balanced against the evidence or data obtained by history and physical and laboratory examinations. It is not so difficult but that it may be mastered by any clinician who maintains a properly functioning workshop.

We trust that Dr. Cheyney will understand that the above comments are not intended in any sense as derogatory to him. His paper enhances his reputation as an able clinician. We feel that these comments are necessary to drive home the point of the great need of establishing earlier means of correctly diagnosing gall-tract disease, thereby giving us a better chance to throttle it in its infancy rather than in the old age of its life-cycle. This we firmly believe is possible by the careful and painstaking application of this method.

In our series of 100 consecutive gall-tract cases so studied we found 27 per cent of clean-cut gall-bladder syndromies, 4 per cent of gall-stone syndromies, 22 per cent of a mixed syndrome (gall tract, duodenum, appendix and colon), whereas 47 per cent presented only a vague atypical dyspepsia with or without biliousness. Eighty-eight per cent of these 47 cases showed an unsuspected masked infection of the duodenobiliary zone, among whom 50 per cent showed streptococcic infection. Of these 100 cases 32 of them could have been readily diagnosed as gall-tract disease if studied only in the light of the history and physical examination, supplemented by roentgen-ray examination and by our usual gastro-intestinal methods; whereas 68 per cent of them would have failed of such diagnosis except by means of direct cytology, bacteriology and chemistry of the bile.

Here, then, is one lesson in diagnosis we have learned, and that the diagnoses were correct was proved by the subsequent results of the plan of treatment employed. It is not our purpose now to go into the minutiæ of diagnosis which has been emphasized in previous papers, but rather to present the field of treatment by duodeno-biliary drainage and some of the lessons it has taught us.

We rather take it for granted that most of you are aware of the inception and development of this method of more intimately approaching the diagnosis into diseases and disorders of the biliary tract and that you are now familiar with the possibilities of treating successfully by this non-surgical method of biliary-tract drainage many of the earlier and some of the later states of gall-bladder and duct disease.

Merely to refresh your memories let me recall to you that the fundamental basis of this method springs from the discovery of the late Professor Samuel J. Meltzer,[1] of the Rockefeller Institute, of the fact that a solution of magnesium sulphate when introduced locally into the duodenum will relax the tonus of the duodenal wall and the sphincter (Oddi's muscle) of the common bile duct, and that almost simultaneously with this relaxation the gall-bladder will expel its fluid contents, partially or wholly, into the duodenum. In previous papers one of us has pointed out the usual sequence of bile flow from the various components of the biliary system, and the method adopted for the recovery of this fluid for chemical, bacteriological and cytological examinations relative to developing a new method of detailed diagnosis and as a direct check on the progress and efficiency of treatment.

It is now our privilege to come before this meeting and declare more positively our belief that it is now possible by this non-surgical method to drain the gall-bladder and biliary ducts of their fluid contents, within certain limits, to which attention has been called in previous papers. In the last of these papers thus far published the scope of this method was summed up as at present developed, first as a *means of diagnosis* of biliary diseases to supplement the usual clinical methods of diagnosis and help given us in many cases by the roentgenologist; secondly, as *an alternative method of treatment* of many types of gall-bladder and duct disease in which there arises a question of opinion as to whether surgery is or is not emphatically and immediately indicated; and, thirdly, as *a supplementary method* of postoperatively continuing the surgical principles of drainage in those cases incompletely cured by surgical means alone.

As a result of four years of practical application of this method of diagnosis and treatment of biliary-tract disease in a series of over 400 cases,we can most earnestly express our belief that it is now a proved and rational method in the successful treatment of early cases, and is possessed of great possibilities of future development in the prevention and control of many of the later and more severe states of disease of the biliary tract, and we trust it may hopefully be extended to certain diseases of the liver, of the pancreas and of some of the more serious of the problem diseases of internal medicine. Future papers will be devoted in part to a discussion of some of the results of an extension of this study into this larger field.

At this time we will not enter into a discussion of the principles and method of draining the gall-bladder except to have you refer briefly to this chart of the biliary system which hangs before you. We believe that the sphincter of Oddi normally is closed during the inter-digestive phase and that it opens in response to the stimulus of food chemistry. Then according to the law of contrary innervation propounded by Dr. Meltzer[1] the gall-bladder empties itself partially or wholly of its contents. The volume of bile expelled by the gall-bladder most probably depends upon the state and composition of gastric food chemistry reaching the duodenum if the experiments of Rost[18] are correct. It is by studying the departure from the normal physiological sequence of events, as seen to follow the local application of magnesium sulphate to the duodenum, as well as by a study of the gross and microscopic appearance, the bacteriology and the physiological chemistry of the recovered bile, that we arrive at definite conclusions relative to the state of the biliary apparatus, both as regards its physiology and pathology.

The first angle from which these cases were studied was from that of previous operation. It was found that 35 cases had been abdominally operated on prior to the present study. Of these 12 had undergone gall-bladder surgery, 9 of them accompanied by appendectomy and 13 had had appendectomies independent of this gall-bladder surgery. After reviewing the 12 postoperative cases of gall-bladder surgery to determine residual infection it was found that positive bacteriology could be demonstrated in the biliary tract in 62 per cent of the cases in which a cholecystectomy had been done and in 100 per cent of the cases in which cholecystostomy had been practised. In this small series, then, it would seem that cholecystectomy is the operation of choice, considering only for the moment the question of residual infection. From the above it will be seen that surgery in the first place failed, in a too large percentage of cases, to free the biliary system of infection; and, in the second place, either failed to remove the primary focus causing multiple secondary foci or failed to recognize the early stages of biliary-tract infection and proceeded to remove the appendix alone.

The next point considered in our study was the question of attempting to find the primary source of the infection which had caused the gall-tract disease. We have felt for a long time that infection in the upper respiratory and digestive tracts is very frequently responsible for many of the acute or chronic conditions in the tract below. The six principal points of primary focal infection we found to be in the tonsils, gums or teeth, the posterior nares, sinuses or the bronchial tree. The five principal secondary foci are the stomach, the duodenum, the gall-bladder, the appendix and the rectosigmoid colon. These may be involved singly, all together, or in series, but surgical or medical treatment directed to any one of them alone will not preclude a recurrence or later development of trouble at one of the other sites unless the primary source of the infection is eradicated. Reviewing our operated group of patients from the standpoint of present or previous infection we found that in the 12 cases previously operated on we are able to demonstrate, by cultural methods, infection still present in the gall tract in 9 cases. Of the 12 cases we found that 10 of them, in addition, showed pathogenic focal infection in the tonsils, teeth or sinuses. Of the 4 other cases whose biliary tract had been previously been operated 1 of them was an exploratory cholecystotomy alone and 3 were for the release of gall-bladder adhesions alone. Here, of course, there was no surgical attempt to remove infection and therefore these cases must be excluded from this angle of analysis. Of 84 cases whose biliary tract had not been previously operated upon we could classify all of them as having various grades of cholecystitis, and that 24 of these 84 cases gave evidence by the tuning-fork or by roentgen-ray examination of the presence of adhesions. Lastly, 14 cases could be classified as having gall-stones in an active or quiescent stage. Analyzing our 84 cases of non-operated gall-tract disease for residual focal infection we found 39 showed abscessed or suspiciously capped teeth; 29 cases had infected tonsils; 18 cases had pyorrhea; 17 cases had postnasal discharge, 3 of which were proved sinus infection; 6 cases had chronic bronchorrhea; and 4 cases had chronic otitis media. Several of these cases combined two or more points of infection.

We will not confuse you with figures relative to a discussion of the associated functional disturbances of the gastro-intestinal tract found in the series of patients, except to say that in the 14 cases of proved or probable cholelithiasis 57 per cent showed the gastric acidity by the fractional method either markedly reduced or absent and 21 per cent showed hyperacidity; but in those cases in which gall-stones could be reasonably excluded we found the gastric acidity reduced in only 34 per cent and absent in none, whereas 41 per cent in this group showed hyperacidity. In this respect our study confirms the findings of other investigators who have formulated a belief that a normal or increased acidity is a laboratory datum supporting a clinical assumption of cholecystitis as against cholelithiasis. This is in accord with the experimental evidence of Rost that the best normal physiological stimulus to the discharge of gall-bladder bile lies in a gastric chemistry rich in proteose, peptones and albumoses. Such conversion is only afforded by a normal or increased gastric juice. Therefore in the subacid or anacid gastric states the gall-bladder bile is more liable to become static and crystals are thrown out of solution. This is the potential stone or precalculous state. If mucosal inflammation or infection be added the formation of gall-stones is accelerated.

Analyzing the possibility of multiple infection of the gastro-intestinal tract we found that 22 patients who had previously had their appendix removed (9 of which were in conjunction with biliary-tract surgery) still showed evidence of residual infection of the gall tract; that 21 cases gave clinical evidence of appendicitis with proved infection of the gall-bladder; that 3 cases showed a lesion of the gall-bladder associated with duodenal ulcer; and that 4 cases suggested associated lesions of the gall-bladder, the duodenum and the appendix. A good many of these cases, also, had inflammation of the rectosigmoid, but were not specifically tabulated.

The question of the significance of biliary regurgitation into the fasting stomach is one that has always interested us and we have come to feel that *frank* biliary regurgitation is evidence of a disturbed physiology of the duodenobiliary mechanism. In the first place we believe the sphincter of Oddi should be closed except during the digestive cycle, and, in the second place, that reversed peristalsis should not occur normally in the fasting duodenum with certain exceptions not to be discussed here. In this study we found that of the cases with previous gall-bladder surgery 71 per cent showed both fasting and digesting biliary regurgitation as against

47 per cent of fasting and 23 per cent of digesting regurgitation in the non-operated cases. From this it would seem that operation on the gall-bladder very definitely disturbed the physiology of this segment of the gastro-intestinal tract. In addition it has been proved experimentally on animals, and by clinical experimental study of these postoperative gall-bladder cases, that surgery in each instance has destroyed the contrary innervation of the gall-bladder and Oddi's sphincter and has changed the normal physiologically intermittent discharge of bile into the duodenum into a pathologically continuous one, with, in many instances, harmful results, notably a severe and intractable diarrhea. All of this series of patients had complaints referable to the gastro-intestinal or biliary-tract systems, but, in addition to these localizing symptoms, a very large number (approximately 50 per cent) gave a history of symptoms suggesting focal infection or of autointoxication, the most prominent being easy fatigue, nausea, headache, dizziness and backache. In 54 of these 100 cases the physical findings in the upper right quadrant were entirely negative; in 46 definite tenderness, muscle spasm or rigidity could be demonstrated. There was no instance of palpable gall-bladder in the series. The average duration of ill health in these patients was eight years. Of this whole series positive bacteriology was demonstrated in 93 cases; the material obtained was sterile in 4 cases and no material was obtained in 3 cases. Of the 93 cases with positive bacteriology the streptococcic group was isolated in 50 per cent, staphylococci in 25 per cent, Bacillus coli in 15 per cent, Bacillus subtilis in 8 per cent, Bacillus pyocyaneus in 1 per cent and Bacillus typhosus in 1 per cent.

We would allude to one other fact brought out from our study, and that is the importance of recognizing catarrhal inflammatory or infected states of the duodenum, independent of duodenal ulcer or adhesions. These states are much more commonly present than is usually realized and have great significance in the causation of vague or atypical dyspepsias, and are conditions which often precede the later states of better developed pathology and a better understood symptom-complex. We found in our series of cases that 56 of them gave evidence of duodenitis, either simple catarrhal or with unusual exfoliation of duodenal epithelium, that 25 of these 56 cases gave evidence of bacterial infection of the duodenal mucosa and that 3 of them were infected with the Lamblia (or Giardia) intestinalis recoverable by tube in the living state. Obviously the diagnosis of these states of duodenitis can be made more accurately by the direct examination of the duodenal fluid than by any of the indirect methods.

To sum up the foregoing the final diagnosis in these 100 cases, based on a careful analysis of the history, physical examination, various special examinations and the detailed information derived from a diagnostic non-surgical biliary drainage, were divided as follows: Gall-bladder syndromes, 27 per cent; gall-stone syndromes, 4 per cent; mixed syndrome (ulcer, appendix, gall-bladder), 22 per cent; and vague atypical dyspepsia (with or without biliousness), 47 per cent. There was "masked" infection, proved by culture, in 88 per cent of the cases. If, however, these cases had been studied only by the usual gastro-intestinal methods, supplemented by analysis of the history, physical examination and the roentgen ray, but without the added information derived from biliary drainage, only 32 per cent could have been diagnosed readily as gall-bladder cases. The remaining 68 per cent were impossible of such diagnosis except by means of direct cytology, bacteriology and chemistry of the bile.

To turn next to the question of treatment, 94 of these cases were treated by us. In all cases but one the chief therapeutic measure consisted in lavage and disinfection of the stomach followed by drainage of the biliary apparatus. The duodenum was then disinfected as a measure of local protection and a duodenal enema of Ringer's solution was given, reinforced where necessary with sodium sulphate, in order to secure a free fluid evacuation promptly and thus sweep out of the intestinal tract such infected bile as failed of recovery in our bottles. The duodenal enema of 250 cc is kept at 103° F. and allowed to drip in slowly in not less than twenty minutes. This whole procedure requires from two to three hours. Colonic irrigations were used only in exceptional cases where indicated. Rectosigmoidal insufflation, after Soper's methods gave us much better results.

As the individual necessities of each case demanded, other indirect therapeutic measures were combined with this direct topical treatment. Medicine was given by oral, subcutaneous, percutaneous and intravenous routes. The only oral medicines used were digestive substitution products and hepatic secretogogues. Electricity, dietetics, glandular therapy, hygiene, psychotherapy, exercise or rest were prescribed in certain cases.

But the first bulwark of treatment was our insistence on topical treatment of the stomach, duodenum, biliary tract and colon. The second agent in which we placed most reliance was the autogenous vaccines. Especially were these useful when they gave rise to a specific focalizing reaction reproducing one or more of the presenting symptoms, and those cases in which they occurred averaged better in their results. Among 58 cases receiving autogenous vaccines there were 17 who gave an unsolicited history of focalizing reactions simulating one or more of the chief complaints. Among these gall-bladder pain or soreness was mentioned 13 times and migraine was mentioned 5 times. Pain in a tooth socket following a vaccine of streptococci obtained from the gall-bladder and from the apex of a tooth root in 1 case. Pain in the tonsillar fossæ following a vaccine of streptococci from gall-bladder and tonsil in 1 case; soreness in the appendiceal region was mentioned once; and increased joint involvement in a case presenting arthritis was mentioned once.

In summarizing the results of treatment by this method in this series of 94 patients we find that 73 of them showed complete arrest of symptoms (symptomatic recovery), 17 showed partial arrest of symptoms (improved) and that 4 of them were unimproved. But checking up from the objective standpoint, based upon a direct examination of the bile, we could demonstrate a complete return to normal findings in the bile in 47 cases, while 35 patients still showed abnormalities of the bile. On 12 patients there was insufficient data on this point to classify them, showing the need of correcting our errors of omission. As we were reviewing the results of treatment we noted the discrepancy in that 73 patients showed a complete symptomatic recovery, and yet in only 47 patients were we able to demonstrate a complete return to normal objective findings in the bile. This has indicated to us the inadequacy of considering simple arrest of symptoms as the criterion of a cure and emphasizes the need of continuing the treatment faithfully until the pathological findings disappear; otherwise relapse is extremely likely to occur. Again it was interesting to observe that as treatment was continued the complete improvement in findings ran more nearly parallel to the complete arrest of symptoms, and this, and this only, should be made the criterion of a real cure. Eight of these patients were diagnosed and treated non-surgically for a short period and then referred for operation, and were then again postoperatively treated by us. All of these patients, except one, made complete recoveries. Postoperative drainage, with protection of and treatment of the duodenum and intestinal tract, we believe to be a most important prophylactic measure to guard against relapse. Finally it was instructive to us to learn that of the 17 cases who complained of focalizing vaccine reactions 90 per cent had complete relief of their symptoms as against 77 per cent for the entire series; and, furthermore, 76 per cent showed complete return to normal findings against 50 per cent for the entire series. Hence our faith has grown in the efficiency of autogenous vaccines when properly selected by repeated culture checks, when properly prepared and properly administered, and particularly so when they give rise to focalizing reactions reproducing a presenting complaint.

In order to illustrate some of the lessons learned in the study of this series of patients, we will present briefly some of the case reports with a few words of comment.

Mr. F. S. W., aged thirty-seven years, was referred to us on June 9, 1920. With the exception of an attack of slight jaundice in 1900 and a tendency to recurrent tonsillitis prior to 1903, at which time his tonsils had been presumably removed by a tonsillotome operation, this patient had enjoyed robust health until he suffered a severe attack of pandemic influenza in October, 1918. With this he was for five weeks very sick in bed. It was complicated by bronchopneumonia and cardiac insufficiency, which prolonged a slow convalescence through several months. In April, 1919, he had an attack of what was called "trench mouth," with spongy, bleeding gums, which lasted for one month. In March, 1920, he was told he had "acidosis," and had been given large doses of milk of magnesia, which he has continued to take for the past three months, with the result that his bowel movements have become very loose, contain slimy and shreddy mucus and are rather foul-smelling. In one year he had decreased in weight from 182 to 155 pounds, although he stands six feet two. His chief complaints were progressive weakness, a sense of nervous gripping in the right epigastrium, followed by a sense of "empty pain" about one hour after meals, sometimes wearing off spontaneously, but always made temporarily better by eating. He also complains of rectal tenesmus.

Physical examination disclosed numerous foci of infection as follows: The tonsils were inflamed and boggy, enlarged and cryptic, and pus could be readily expressed from both of them, smears from which recovered streptococci in abundance. Roentgen ray of his teeth showed three well-defined abscesses. His stomach examination disclosed a definite infective catarrhal gastritis, with a high normal secretion and motility retarded intermittently by pylorospasm. His duodenal cytology showed a moderate catarrhal and exfoliative duodenitis, and drainage of his gall-tract demonstrated a well-marked and exfoliative cholecystitis and choledochitis with masked infection. Cultures from his "B" bile recovered a hemolytic streptococcus. His gall-bladder discharge ranged between 90 and 150 c.c. of static, green-black, slightly turbid bile of increased viscosity, and contained large numbers of mucopus flocculations. The microscopy of this showed much bile-stained columnar epithelial exfoliation, numerous pus cells, a large amount of precipitated bile salts and cholesterin crystals and numerous colonies of bile-stained cocci. As a result of this inflammatory state we found the common duct uniformly open in the fasting state without the use of magnesium sulphate. This we believe to be evidence of disturbed physiology which may be functional or associated as a reflex to pylorospasm, appendicitis and colitis, but which occurs much more commonly when there is a duodenitis or inflammation of the gall tract.

He presented historically the symptom-complex of duodenal ulcer, but which, in the absence of specific laboratory and roentgen-ray confirmation, we have come to recognize as our mixed syndrome, which may be functional pylorospasm, duodenitis, duodenal ulcer, cholecystitis, appendicitis and, rarely, ileocolitis, with special involvement of the rectosigmoid. He gave, however, no direct clinical, historical or physical findings that suggested gall-tract disease other than his attack of catarrhal jaundice twenty years previously. In addition, on examination we found a suspicious tenderness in the region of his appendix or cecum and an inflamed or spastic sigmoid. His blood showed a moderate secondary anemia with a negative Wassermann. His pulmonary, cardiac, renal and endocrine systems were relatively normal, but his nervous system was distinctly under tension, with a disturbed sleep picture of involuntary twitchings and a tendency to fantastic nightmares.

Here, then, was the picture of disseminated infection of the gastro-intestinal tract, most probably emanating from the tonsils and contributed to by the infection at his tooth roots, and, with his general resistance materially broken down by the severe type of influenza, with its complications, through which he had passed, we find his mucosal surfaces a fertile ground for the transplantation of the streptococcus.

As a first step in his treatment we had his tonsils removed and cultured and a vaccine was made from the hemolytic streptococci recovered from them, mixed in equal amount with the same organism grown from his gall-bladder bile. The similarity of growth of these streptococci in various media suggested them to be of the same strain. Two of the three teeth showing apical abscesses were extracted in Boston (no culture being made, unfortunately) and the sockets treated. He was then given a duodenobiliary drainage with a duodenal enema twice a week, together with a vaccine injection and iron citrate, sodium cacodylate and sodium glycerophosphate subcutaneously. His symptomatic response was prompt and his recovery was progressive. After seventeen such treatments he had gained fourteen pounds (from 155 to 169) and was called back to Boston by business and was referred into the care of Dr. Franklin W. White, who continued his treatment at greatly increased intervals. During our observation of him his abnormal findings in the duodenum and gall tract had progressively improved, and on December 31, 1920, Dr. White writes: "The last bile drainage was done on December 22. The bile was a very clear green-yellow with nothing abnormal in the sediment. He is feeling entirely well and has gained steadily from 169 to 186 pounds, which he weighs today." Six months later this patient still remains perfectly well.

Comment. This case represents a severe type of disseminated infection of the gastro-intestinal canal, with a masked lesion in the gall-bladder in the early stage, in which the symptoms are more suggestive of a pyloro-duodenal ulceration rather than involvement in the gall tract. It illustrates the importance of early diagnosis by the differential methods we have advocated. Later on the symptomatic picture will change and may call attention to the gall-bladder, but often by that time the pathology is extensive. This case finally teaches us that we may achieve excellent results and may prevent the necessity for later surgery in many cases; but we must start our treatment by removing all recognizable foci higher up in the tract and then energetically treat the condition itself by topical and direct methods. We have 18 other cases in our series of 100 studied and treated who may be classed in this group.

Miss E. B., aged forty-three years, referred to us on July 11, 1920, had for ten years been suffering from severe prostrating migraine attacks which occurred in somewhat definite cycles every ten days to two weeks. She had tried out a great many remedies for relief of these sick headaches, with apparently no improvement.

She gave a history of absolutely no preceding infections in her past life except a stuffiness and catarrh in the left Eustachian tube, which has been under constant treatment by a most excellent specialist, with distinct improvement, and yet showed a tendency toward relapse.

On very careful physical examination she had absolutely normal findings in her eyes, nasopharynx, bronchial tree, lungs, heart, kidneys and pelvic organs. Her gastro-intestinal studies were likewise negative except for the particular findings in the gall-bladder and duodenum, which will be mentioned later. She had had constant and progressively more obstinate constipation for many years and represented a typical constipation-laxative habit vicious circle.

She states that the migraine attacks come almost without warning, with no causative factor to which she can ascribe them. They last from two to four days of intense prostrating "sick" attacks, and when at the worst are always accompanied by dry retching and terminal vomiting of bile, which usually brings the attack to a close. She has temporary relief in the use of cholagogues, especially calomel and salts. She describes the attacks as beginning with a "thick" feeling in the head, followed by pain which is first felt over the right eye and radiates down the temple to the right mastoid region. Less frequently the pain is felt, also, over the left orbital region, with the same distribution. This may be due to the influence of Arnold's auricular branch of the pneumogastric nerve. The abdominal physical findings were entirely negative, although special attention was paid to the gall-bladder region.

No direct diagnostic evidence could then be furnished from her examinations, which pointed toward the gall-bladder, except the historical data of recurring bilious attacks associated with migraine and the further fact that she had been noticing a progressive brownish pigmentation of her skin, which had been definitely deepening during recent years.

Her duodenobiliary drainage examinations supplied the necessary diagnostic data, for we found the gall-bladder bile to be static, inky-black, with increased viscosity and mucosity, and delivered intermittently in the manner of the atonic flow previously described, and infected with a Streptococcus viridans and Bacillus coli. In this "B" bile was found a large amount of flocculent sediment, the cytology of which showed marked exfoliation of tall columnar, bile-stained gall-bladder epithelium, with much amorphous bile salts, cholesterin crystals, pus cells, spiraled strands of mucus and bile-stained bacteria in the colony formation representative of true infection.

Her treatment consisted of duodenobiliary drainage, followed by duodenal enema twice a week for two weeks, then once a week for a month, then twice a month for a period of three months. Autogenous vaccines were given every five to seven days and caused a focalizing reaction reproducing the migraine. With the exception of pancrobilin nothing else was used for her constipation.

The result of this treatment showed steady progressive improvement both in symptoms and in the objective findings in the bile. The migraine attacks became of lighter and lighter severity and of decreasing frequency, and she noted a general systemic improvement in her increased alertness, power of concentration, better sleep states, increased amount of vigor, and especially notable to her was the progressive absence of her sense of daytime drowsiness and the rather remarkable clearing of the brownish pigmentation of her skin and improvement in her complexion.

She has recently been seen and reëxamined and has had no headache for a little over four months, and says she feels splendidly well. She had had no bilious attacks; her skin was clear and showed practically none of the earlier pigmentation; her bowels were moving once daily and naturally, without any laxation; and her biliary drainage showed an absence of all the direct evidence recorded above upon which her diagnosis had been based.

(To be continued in February issue.)

VISCERAL ADHESIONS AND BANDS; NORMAL INCIDENCE. A PRELIMINARY REPORT.[1]

By John Bryant, M.D.,
BOSTON.

The material which is the basis of this paper was obtained before the World War incidental to a much more comprehensive investigation into the etiology and treatment of the chronic intestinal invalid.

[1] Read at the Annual Meeting of the Gastro-enterological Association, Boston, June 6, 1921. Original data for this article was obtained in 1912–1914 through the courtesy of Professors Pick and von Hanseman, of Berlin, Professor Fränkel of Hamburg and the students then working in their pathological institutes.